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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/728,916

Filing Date: December 08, 2003

Appellant(s): TONOSAKI ET AL.

Stefan U. Koschmieder
For Appellants

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 5, 2008 appealing from the Office action mailed February 5, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.
However, a copy of the withdrawn claims is also present.

(8) Evidence Relied Upon

2003/0066625	KIRSCHBERG ET AL.	4-2003
5,562,949	STEELE ET AL.	10-1996
5,943,543	UCHIDA ET AL.	8-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11-12, 14-16, 25, 27, 29, 31-32, 36, 38, 40, 44, 48-49, 51 and 53 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification lacks an adequate written description of the invention.

There is no basis for “a first glass and a first substrate” and “a second glass and a second substrate” in claim 1. The specification discloses only a single glass substrate.

There is no basis for “the first and second substrates are at least one of a *glass substrate* and a silicon substrate” in claim 1. The specification discloses the device is composed of only a glass and silicon substrate, not two glass substrates.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-12, 14-16, 25, 27, 29, 31-32, 36, 38, 40, 44, 48-49, 51 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kirshberg et al in view of Steele et al or Uchida et al.

Kirshberg et al discloses a heat-transport device comprising a refrigerant; a glass 22 and silicon substrate 21 defining an evaporator 10, a condenser 12, a liquid passage 16, a vapor passage 14, and a wick 24 in the evaporator (Figure 2), but does not disclose a silicon dioxide coating.

Steele et al discloses a heat exchanger comprising a heat transfer surface and a hydrophilic coating of silicate for the purpose of improving wetting and wicking properties to improve heat transfer (column 3, lines 35-40 and 55-60).

Uchida et al discloses a heat exchanger comprising a heat transfer surface and a hydrophilic coating of silicon dioxide for the purpose of improving wetting and wicking properties to improve heat transfer (column 7, lines 7-11).

Since Kirshberg et al and Steele et al or Uchida et al are both from the same field of endeavor and/or analogous art, the purpose disclosed by Steele et al or Uchida et al would have been recognized in the pertinent art of Kirshberg et al.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Kirshberg et al a hydrophilic coating of silicon dioxide or silicate for the purpose of improving wetting and wicking properties to improve heat transfer as recognized by Steele et al or Uchida et al. Further, it would have been obvious to one of ordinary skill in the art to apply a known technique to a known device ready for improvement to yield predictable results. *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007).

The recitation of “formed by ... oxidation” is considered to be a method limitation in an apparatus claim, which bears no patentable weight in this instance. See MPEP 2113.

Regarding claim 12, the first and second glass is read as being the same material. Similarly, the first and second substrates are read as being the same material, i.e. silicon.

Regarding claims 14 and 29, Steele et al or Uchida et al discloses the silicon dioxide is a hydrophilic, i.e. an affinity for water (H_2O). Furthermore, water is a well-known working fluid in heat pipes.

Regarding claims 15 and 31-32, the silicon dioxide or silicate coating as taught by Steele et al or Uchida et al would be disposed wherever enhanced wetting and wicking is required. In this instance, only the wick of Kirshberg et al on glass 22 would be coated to provide enhancement.

Regarding claim 16, the recitation of “by anodic bonding” is considered to be a method limitation in an apparatus claim, which bears no patentable weight in this instance. See MPEP 2113.

Regarding claim 25, the recitation of “ion implanted” is considered to be a method limitation in an apparatus claim, which bears no patentable weight in this instance. See MPEP 2113.

Regarding claim 27, the wick 24 of Kirshberg et al are grooves.

Regarding claim 36, the recitation of “by chemical vapor deposition” is considered to be a method limitation in an apparatus claim, which bears no patentable weight in this instance. See MPEP 2113.

Regarding claims 38 and 40, the similar coating of Steele et al or Uchida et al is believed to function in a manner similar to applicants. See also MPEP 2114.

Regarding claim 48, Kirshberg et al (abstract) discloses the device is a CPL.

Regarding claims 49 and 51, the specific dimensions of the condenser and wick grooves is considered to be an obvious design choice. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any desired dimensions, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Further, it would have been obvious to one of ordinary skill in the art to try - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success. *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007).

(10) Response to Argument

Initially, it is noted the method claims have been withdrawn to a nonelected invention. The method limitations in the product claims bear no patentable weight in this instance. See MPEP 2113. Any remarks with respect to the method limitations are moot.

A. Rejection under 35 U.S.C. 103(a) as being unpatentable over Kirshberg et al in view of Uchida et al.

With respect to claim 11, appellant acknowledge Kirshberg et al discloses a device similar to the instant invention, especially on the same “micro” scale.

Throughout the prosecution history, appellants have never traversed the fact that Uchida et al discloses a silicon dioxide (SiO₂) coating for heat exchanger surfaces to impart wettability

or hydrophilic characteristics. Appellants have never requested clarification or citation with respect to the disclosure of Uchida et al.

The Examiner disagrees that the devices of Kirshberg et al and Uchida et al different. Clearly, one of ordinary skill in the art would appreciate the teaching of Uchida et al to increase the performance of the heat transfer surface of Kirshberg et al by providing improved wetting or wicking capabilities. As well known in the art of capillary pumped loops (CPLs), the wick structure provides the fluid pumping or transport function of the devices. In the device of Kirshberg et al, the wick in the evaporator section ensures fluid is supplied by the reservoir, and the wick in the condenser section ensures fluid is supplied to the evaporator section from the liquid line. The Examiner agrees the silicon dioxide coating of Uchida et al is employed on a metal heat transfer surface. However, Uchida et al does not explicitly exclude the use of a silicon dioxide coating on a nonmetal heat transfer surface. As noted in the grounds of rejection above, it would have been obvious to one of ordinary skill in the art to apply a known technique to a known device ready for improvement to yield predictable results. *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007). In this instance, the known technique is employing a hydrophilic coating of silicon dioxide or silicate on a heat transfer surface to yield a predictable result of improving wetting and wicking properties to improve heat transfer performance. Uchida et al (column 7, lines 7-11, reproduced below) explicitly discloses this motivation.

coating material. When a hydrophilic coating material containing silicon dioxide is applied on the heat transmitting face in order to cope with corrosion, the heat transmitting performance can be improved or maintained on the basis of an enhanced wettability.

With respect to claim 32, in the citation above, Uchida et al discloses a silicon dioxide coating on a heat transfer surface to enhance wettability. In this instance, only the wick 24 or 26 of Kirshberg et al on glass 22 (Figure 3) would be coated to provide enhancement. Thus, when the wick 24 or 26 on glass 22 of Kirshberg et al is coated with silicon dioxide, a silicon dioxide coating will be formed between glass and the working fluid, i.e. refrigerant.

With respect to claims 49 and 51, appellants do not traverse the fact that the specific dimensions of the condenser and wick grooves are considered to be an obvious design choice as supported by *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007). See grounds of rejection above. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Thus, one of ordinary skill in the art would employ the teachings of Uchida et al to apply a hydrophilic coating of silicon dioxide for the purpose of improving wetting and wicking properties to improve heat transfer. A person having ordinary skill in the art would employ any known methods to form the silicon dioxide coating in the device of Kirshberg et al.

B. Rejection under 35 U.S.C. 103(a) as being unpatentable over Kirshberg et al in view of Steele et al.

The Examiner agrees the secondary reference of Steele et al is similar to Uchida et al, in that, Steele et al (column 3, lines 35-40 and 55-60, reproduced on the following page) also

teaches one of ordinary skill in the art to employ a silicate (SiO_2) on a heat transfer surface to enhance wicking and wetting characteristics to improve heat transfer performance.

Although the present inventive low solids, optionally antimicrobial, hydrophilic coating will be described herein in reference to coating heat transfer surfaces in a condenser, it is not limited thereto. This coating can be utilized on any surface in which wetting and wicking, and optionally, the inhibition of microbial proliferation, are desired.

The inorganic compound must facilitate wetting, not impart a hydrophobic characteristic to the coating, have an equilibrium dissolution rate similar to other components of the coating, and have a low solubility in water. A few such inorganic compounds include uncoated silica, calcium silicate particles, and mixtures thereof.

As noted in section A above, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Thus, one of ordinary skill in the art would employ the teachings of Steele et al to apply a hydrophilic coating of silicate for the purpose of improving wetting and wicking properties to improve heat transfer. The specific method or process of forming the silicate coating of Steele et al is believed of no consequence, since the teaching of a silicate coating in a final product is the main concern. One of ordinary skill in the art would employ any known methods to form the silicate coating.

With respect to claims 49 and 51, although Steele et al discloses a preferred range of silicate coating thickness when used with water, one of ordinary skill in the art would employ

any desired thickness to achieve desired heat transfer characteristics or due to economic constraints. Furthermore, Steele et al discloses the 100 micron coating thickness *may* decrease the coating life. However, the coating thickness *might not* decrease the coating life, and the coating life depends on a relative time frame.

With respect to claim 53, the Examiner withdraws the rejection in view of Steele et al.

C. Rejection under 35 U.S.C. 112, first paragraph

The Examiner believes there are two aspects of claim 1 which are not supported by the specification. Firstly, there is no basis for “a first glass and a first substrate” and “a second glass and a second substrate” in claim 1. Appellants’ citation (pages 7-8) discloses a plurality of substrates bonded together, which consistent with the specification and embodiments are read as two substrates. There is no written description with respect to more than two substrates bonded together to form a main body. Secondly, there is no basis for “the first and second substrates are at least one of a *glass substrate* and a silicon substrate” in claim 1. Appellants’ citation (page 4) discloses the base material is silicon or glass. No where in the specification does the term “base material” appear. Again, the Examiner believes the invention as originally filed discloses only a pair of substrates bonded together, where one is glass and the other is silicon. There is no embodiment disclosing a glass to glass substrate bonded device. It is further believed the specification includes remnants from a commonly assigned copending application during drafting of the instant application.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

Art Unit: 3744

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/ LEONARD R. LEO /
PRIMARY EXAMINER
ART UNIT 3744

August 19, 2008

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